

PATENT ABSTRACTS OF JAPAN

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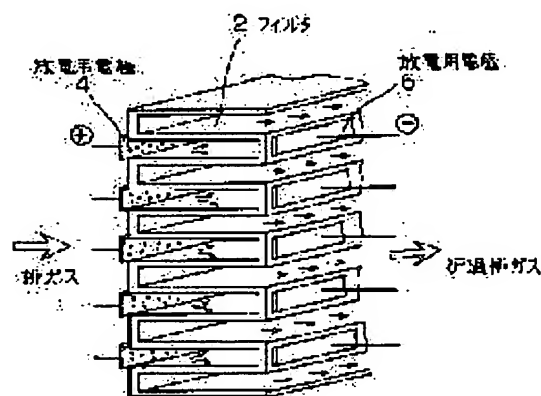
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(54) BLACK SMOKE REMOVAL DEVICE FOR DIESEL ENGINE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a black smoke removal device for a diesel engine furnished with a filter for black smoke removal capable of regenerating the filter economically and efficiently while the engine works.

SOLUTION: A black smoke removal device for a diesel engine is constituted to apply voltage between electrodes 4, 6 for charging by arranging the electrodes 4, 6 for charging by sandwiching a filter 2 for black smoke removal. An arc is generated with black smoke substance as a consumable electrode when the black smoke substance is accumulated on the filter 2.

**LEGAL STATUS**

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CLAIMS

[Claim(s)]

[Claim 1] The black-smoke stripper for diesel power plants characterized by constituting so that an electrode pattern may be arranged between said filters and an electrical potential difference may be impressed between these electrode patterns in the black-smoke stripper for diesel power plants equipped with the filter for black-smoke clearance.

[Claim 2] The black-smoke stripper for diesel power plants according to claim 1 characterized by using said electrode pattern as a porous electrode.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the black-smoke stripper for diesel power plants which made the filter refreshable during engine operation especially about the black-smoke stripper for diesel power plants equipped with the filter for black-smoke clearance.

[0002]

[Description of the Prior Art] Although the diesel power plant is excellent in the fuel consumption engine performance and endurance, many black-smoke particles (diesel particulate) are contained in the exhaust gas of a diesel power plant, and the harmful nature is pointed out. Therefore, reduction of a black-smoke particle is very important for the diesel power plant excellent in the fuel consumption engine performance. Various proposals are made by black-smoke reduction of a diesel power plant about engine amelioration and exhaust gas after treatment.

[0003] Among these, the following is conventionally proposed as an exhaust gas after-treatment technique. First, uptake of the black smoke is carried out with a filter, heat is applied to a filter by the electric heater after an engine shutdown, and there is a thing it was made to make the black smoke adhering to a filter incinerate. In this technique, filter playback must stop an engine for filter playback, when it is carried out by applying for about 1 hour every filter operation 8 time amount and time and effort is taken dramatically, and it has the problem of needing big external power, a big air pump, etc. Moreover, in what was made to carry out uptake of the black smoke with a filter, there is a thing inject [thing] a secondary fuel near a filter and it was made to burn a black smoke during engine operation. There is a problem that fuel consumption gets worse, in the black-smoke stripper of this method.

[0004] Furthermore, what reproduced the filter by the back wash with air as carried out uptake of the black smoke with a filter is proposed. However, since a black-smoke particle contains a part for a fusibility hydrocarbon in a very thin top, it has the property which will be hard to remove if it adheres to a filter, and there is a difficult field in playback of the filter by the back wash. Moreover, although the system which reproduced another side is adopted while making two black-smoke clearance filters arrange in parallel, furnishing and working one side, there is a problem that a facility becomes large and cost increases.

[0005]

[Problem(s) to be Solved by the Invention] In the black-smoke stripper for diesel power plants equipped with the filter for black-smoke clearance, this filter is made economical during engine operation, and this invention makes it the technical problem to offer the black-smoke stripper for diesel power plants constituted refreshable efficiently.

[0006]

[Means for Solving the Problem] In order to solve said technical problem, in the black-smoke stripper for diesel power plants equipped with the filter for black-smoke clearance, this invention arranges an electrode pattern between said filters, and offers the black-smoke stripper for diesel power plants constituted so that an electrical potential difference might be impressed between these electrode patterns.

[0007] According to the black-smoke stripper for diesel power plants of this invention with the above configuration, if a black-smoke particle accumulates on a filter inter-electrode [for discharge], the deposited black-smoke matter itself will serve as a consumable electrode, and the black-smoke matter which the arc generated and deposited will burn. If the black-smoke matter deposited by arc discharge is exhausted, an arc will disappear and a filter will be reproduced.

[0008] In the black-smoke stripper for diesel power plants of this invention, only the filter part which carried out blinding by the black-smoke matter is automatically reproduced by arc discharge. The black-smoke

stripper of this invention removes the black-smoke matter deposited during actuation of a diesel power plant at the filter, and playback of a filter is possible for it, therefore it does not need to arrange a filter in parallel two pieces and to install it for playback,, either.

[0009] In the black-smoke stripper for diesel power plants of this invention, if the electrode pattern installed between filters is used as a porous electrode, the part which installed the electrode pattern shall also have permeability and the filter of the part shall also function effectively as an object for clearance of a black-smoke particle.

[0010]

[Embodiment of the Invention] Hereafter, based on the operation gestalt illustrating the black-smoke stripper of the diesel power plant by this invention, it explains concretely.

[0011] (The 1st operation gestalt) The black-smoke stripper for diesel power plants by the 1st operation gestalt using cross-flow type filter structure is first explained using drawing 1 . In drawing 1 , 2 is the ceramic filter which has thermal resistance by porosity, and it has the filter wall put in order by parallel and emission close space is formed alternately, and exhaust gas is filtered in the space between the inflow space, flows out, and is discharged as filtration exhaust gas. One electrode 4 was connected to (+), the electrode 6 of another side was connected to (-), 4 and 6 are electrode patterns, as shown in drawing, each emission way is met, and an electrical potential difference is impressed among these electrodes 4 and 6.

[0012] In the black-smoke stripper of drawing 1 , if the black-smoke matter accumulates on the filter 2 between electrodes 4 and 6, with the electrical potential difference currently impressed among electrodes 4 and 6, an arc will occur, will burn the deposited black-smoke matter, and will reproduce a filter 2. If the deposited black-smoke matter burns and the black-smoke matter is lost, an arc will disappear. An arc generates a filter 2 only in the part which carried out blinding by the black-smoke matter, and playback is performed automatically.

[0013] (The 2nd operation gestalt) Next, the black-smoke stripper for diesel power plants by the 2nd operation gestalt using Wall flow type filter structure is explained using drawing 2 . In drawing 2 , 10 is the ceramic filter which has thermal resistance by porosity, is fabricated by the form where it has a square cel hole, and has structure which stopped the entrance side and outlet side of exhaust gas by turns by ***** 12 so that it may see in drawing. Exhaust gas flows in a square cel hole from opening of an entrance side, passes a filter 10, flows in the cel hole with which the entrance side was carried out ***** 12, and flows out of an outlet side as filtration exhaust gas. The black-smoke particle contained in exhaust gas in this process is removed.

[0014] Thus, the whole sale wall functions as a filter and, as for the filter of the Wall flow mold, a big filter area is obtained as compared with outside **. By the entrance side of exhaust gas, the electrode pattern 14 of porosity meets mutually and is arranged at the inner surface of the ceramic which forms the cel hole carried out ***** 12. Between electrode patterns 14, if the electrical potential difference is impressed and the black-smoke matter adheres to a filter 10, the black-smoke matter itself will serve as a consumable electrode, an arc will occur, and the black-smoke matter will burn. If the black-smoke matter is lost by combustion, an arc will disappear and a filter will be reproduced.

[0015] (The 3rd operation gestalt) Next, the black-smoke stripper for diesel power plants by the 3rd operation gestalt is explained using drawing 3 - drawing 6 . In drawing 3 , 20 is a ceramic filter which has thermal resistance by porosity. As only one of this ceramic filter 20 is taken out and shown in drawing 4 , what put in order the porosity unit cell fabricated by the prism form in the air where it had a square cel hole is constituted in piles in multistage. Although this porosity unit cell adjoins each other up and down, it has the structure where the end section was made alternate ***** 22.

[0016] As shown in drawing 5 , the electrode 24 for discharge is inserted in the ceramic filter 20 from opening of the edge in every other one. Moreover, the electrode-pattern plate 26 of porosity intervenes between the ceramic filters 20 which adjoin each other up and down. The electrode 24 for discharge is connected to (+), the electrode-pattern plate 26 is connected to (-), and an electrical potential difference is impressed.

[0017] It is filtered in the up-and-down ceramic filter 20, and the exhaust gas which flowed from opening to which the black-smoke stripper for diesel power plants of this 3rd operation gestalt has the above configuration, and a ceramic filter 20 is not carried out ***** 22 flows out, as shown in drawing 6 , and it flows out of an outlet as filtration exhaust gas. The black-smoke particle contained in exhaust gas in this process is removed. If the black-smoke matter filtered by the ceramic filter 20 accumulates, the black-smoke matter itself will serve as a consumable electrode, an arc will occur between the electrode 24 for discharge, and the electrode-pattern plate 26, and the black-smoke matter will burn. If the black-smoke matter is lost by

combustion, an arc will disappear and a filter will be reproduced.

[0018] Thus, although a ceramic filter 20 is automatically reproduced during engine operation, it is also possible to reproduce by burning the black-smoke matter which at least the one moon stopped the engine periodically, connected the electrode-pattern plate 26 to (+), and deposited it as a heater using this in addition to such playback actuation.

[0019] As mentioned above, although concretely explained based on the operation gestalt illustrating this invention, it cannot be overemphasized that various modification may be added to the concrete structure and a configuration within the limits of this invention which this invention is not limited to these operation gestalten, but is shown in a claim.

[0020] For example, although the cross-flow type and Wall flow type thing is used as a filter for black-smoke clearance with the above-mentioned operation gestalt, the filter of various types may be adopted, without being limited to this type.

[0021]

[Effect of the Invention] As explained above, in the black-smoke stripper for diesel power plants equipped with the filter for black-smoke clearance, this invention arranges an electrode pattern between said filters, and offers the black-smoke stripper for diesel power plants constituted so that an electrical potential difference might be impressed between these electrode patterns.

[0022] According to the black-smoke stripper for diesel power plants of this invention with the above configuration, if a black-smoke particle accumulates on a filter inter-electrode [for discharge], the deposited black-smoke matter itself will serve as a consumable electrode, and the black-smoke matter which the arc generated and deposited on the filter part which carried out blinding by the black-smoke matter will burn. If the black-smoke matter deposited by arc discharge is exhausted, an arc will disappear and playback of a filter will end it.

[0023] The black-smoke stripper of this invention removes the black-smoke matter deposited during actuation of a diesel power plant at the filter, and playback of a filter is possible for it, therefore it does not need to arrange a filter in parallel two pieces and to install it for playback,, either.

[0024] In the black-smoke stripper for diesel power plants of this invention, by what used as the porous electrode the electrode pattern installed between filters, the filter of the part which installed the electrode pattern also has permeability, and the filter of the part also functions effectively as an object for clearance of a black-smoke particle.

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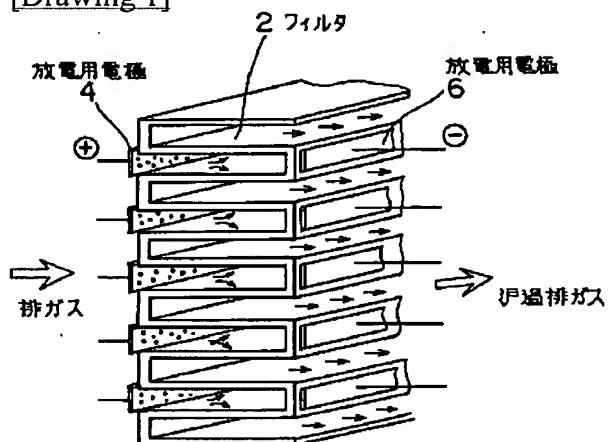
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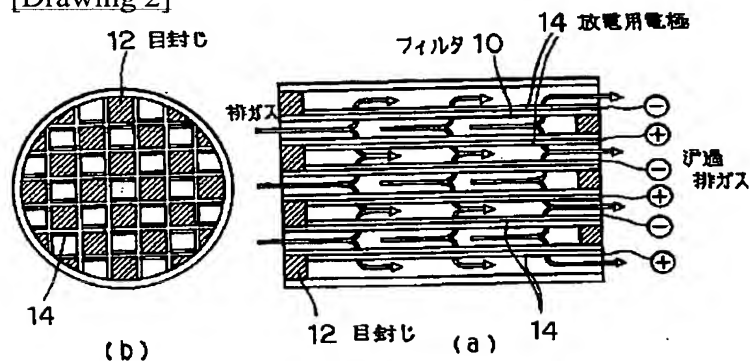
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DRAWINGS

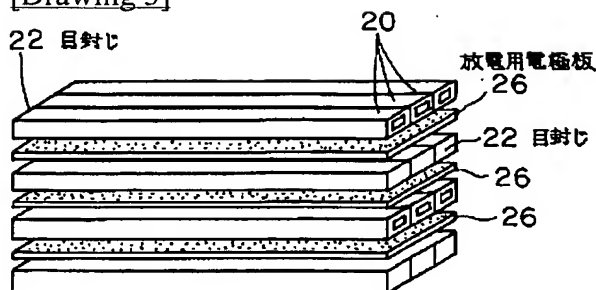
[Drawing 1]



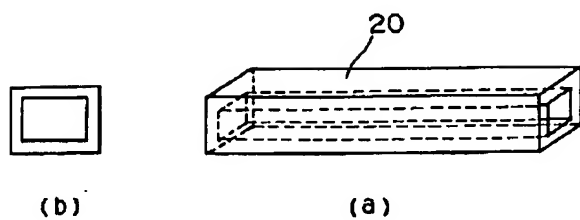
[Drawing 2]



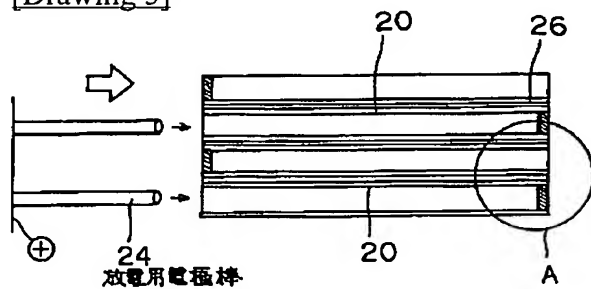
[Drawing 3]



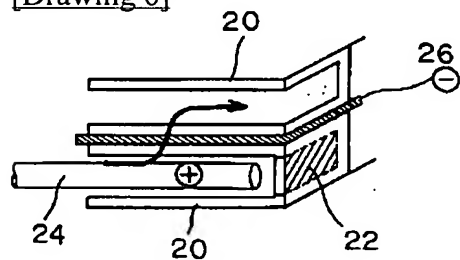
[Drawing 4]



[Drawing 5]



[Drawing 6]



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